LISTING OF THE CLAIMS:

Claim 1 (Currently Amended) A method of substantially reducing the number of tile or divot defects that are present in a silicon-on-insulator (SOI) substrate, said method comprising the steps of:

(a) implanting oxygen ions into a surface of a Si-containing substrate, said implanted oxygen ions having a concentration sufficient to form a buried oxide region during a subsequent annealing step; ~~and~~

(b) annealing said substrate containing said implanted oxygen ions in an ambient gas that comprises from about 0 to about 90% oxygen and from about 10 to about 100% of N_2 to form said buried oxide region which electrically isolates a superficial Si-containing layer from a bottom Si-containing layer, wherein said annealing is carried out until ~~reduces the number of~~ tile or divot defects present at a top surface of said superficial Si-containing layer are reduced so as to allow optical detection of any other defect that has a lower density than the tile or divot defect; and

(c) optically detecting said other defects.

Claim 2 (Original) The method of Claim 1 wherein step (a) comprises a single oxygen base implant or a base oxygen implant followed by a second oxygen implant, said

second oxygen implant is carried out at a temperature lower than the base oxygen implant.

Claim 3 (Original) The method of Claim 2 wherein said second oxygen implant step is carried out using an oxygen dose of from about 1E14 to about 1E16 cm^{-2} and at an energy of about 40 keV or greater.

Claim 4 (Original) The method of Claim 3 wherein said second oxygen implant step is carried out using an oxygen dose of from about 1E15 to about 4E15 cm^{-2} and at an energy of from about 120 to about 450 keV.

Claim 5 (Original) The method of Claim 2 wherein said second oxygen implant step is carried out at a temperature of from about 4K to about 200°C at a beam current density of from about 0.05 to about 10 mA cm^{-2}.

Claim 6 (Original) The method of Claim 5 wherein said second oxygen implant step is carried out at a temperature of from about 25° to about 100°C at a beam current density of from about 0.5 to about 5.0 mA cm^{-2}.

Claim 7 (Original) The method of Claim 2 wherein said base oxygen implant comprises a high-dose oxygen implant which is carried out using an oxygen dose of about 4E17 cm^{-2} or greater.

Claim 8 (Original) The method of Claim 7 wherein said high-dose oxygen implant is performed using an oxygen dose of from about 4E17 to about 4E18 cm^{-2}.

Claim 9 (Original) The method of Claim 7 wherein said high-dose oxygen implant is carried out at an energy of from about 10 to about 1000 keV.

Claim 10 (Original) The method of Claim 9 wherein said high-dose oxygen implant is carried out at an energy of from about 120 to about 210 keV.

Claim 11 (Original) The method of Claim 7 wherein said high-dose oxygen implant is carried out at a temperature of from about 200° to about 800°C at a beam current density of from about 0.05 to about 500 mA cm^{-2}.

Claim 12 (Original) The method of Claim 11 wherein said high-dose oxygen implant is carried out at a temperature of from about 200° to about 600°C at a beam current density of from about 4 to about 8 mA cm^{-2}.

Claim 13 (Original) The method of Claim 2 wherein said base oxygen implant comprises a high-energy, high-dose oxygen implant which is carried out using an oxygen ion dose of about 4E17 cm^{-2} or greater and at an energy of about 60 keV or greater.

Claim 14 (Original) The method of Claim 13 wherein said high-energy, high-dose oxygen implant is carried out using an oxygen ion dose of from about 5E17 to about 7E17 cm^{-2} and at an energy of from about 200 to about 500 keV.

Claim 15 (Original) The method of Claim 13 wherein said high-energy, high-dose oxygen implant is performed at a temperature of from about 100° to about 800°C at a beam current density of from about 0.05 to about 500 mA cm^{-2}.

Claim 16 (Original) The method of Claim 15 wherein said high-energy, high-dose oxygen implant is performed at a temperature of from about 300° to about 700°C.

Claim 17 (Original) The method of Claim 2 wherein said base oxygen implant comprises a low-dose oxygen implant which is carried out using an oxygen dose of about 4E17 cm^{-2} or less.

Claim 18 (Original) The method of Claim 17 wherein said low-dose oxygen implant is performed using an oxygen dose of from about 1E17 to about 3.9E17 cm^{-2}.

Claim 19 (Original) The method of Claim 17 wherein said low-dose oxygen implant is carried out at an energy of from about 20 to about 10000 keV.

Claim 20 (Original) The method of Claim 19 wherein said low-dose oxygen implant is carried out at an energy of from about 100 to about 210 keV.

Claim 21 (Original) The method of Claim 17 wherein said low-dose oxygen implant is carried out at a temperature of from about 100° to about 800°C.

Claim 22 (Original) The method of Claim 21 wherein said low-dose oxygen implant is carried out at a temperature of from about 200° to about 650°C at a beam current density of from about 0.05 to about 500 mA cm^{-2}.

Claims 23-24 (Cancelled)

Claim 25 (Previously Presented) The method of Claim 1 wherein said ambient gas comprises 100% N_2.

Claim 26 (Previously Presented) The method of Claim 1 wherein said ambient gas is admixed with Ar.

Claim 27 (Previously Presented) The method of Claim 1 wherein said annealing step is carried out at a temperature of from about 1250°C or greater for a time period of from about 1 to about 100 hours.

Claim 28 (Original) The method of Claim 27 wherein said annealing step is carried out at a temperature of from about 1300° to about 1350°C for a time period of from about 2 to about 24 hours.

Claim 29 (Previously Presented) The method of Claim 1 wherein said annealing step includes a ramp and soak-heating regime.

Claim 30 (Previously Presented) The method of Claim 1 wherein said annealing step comprises the steps of: partially annealing the Si-containing substrate containing the implanted oxygen ions in oxygen so as to form a surface layer of oxygen on the Si-containing and to partially form said BOX region; stripping the surface layer of oxygen; and continuing the annealing in said oxygen and N_2 gas anbient to complete formation of said BOX region.

Claim 31 (Original) The method of Claim 30 wherein said partially annealing is carried out in an ambient that comprises from about 1 to about 100% oxygen and from about 0 to about 99% inert gas.

Claim 32 (Original) The method of Claim 31 wherein said inert gas comprises He, Ar, Kr, N_2 or mixtures thereof.

Claim 33 (Previously Presented) The method of Claim 31 wherein said ambient gas comprises N_2 or a mixture of N_2 and Ar.

Claim 34 (Original) The method of Claim 30 wherein said partial annealing is performed at a temperature of from about 1250° to about 1400°C for a time period of from about 1 to about 100 hours.

Claim 35 (Original) The method of Claim 34 wherein said partial annealing is performed at a temperature of from about 1320° to about 1350°C for a time period of from about 2 to about 20 hours.

Claim 36 (Original) The method of Claim 30 wherein said surface layer of oxygen is removed utilizing a wet etch process that includes an etchant that has a high-selectivity for removing oxide compared with Si.

Claims 37-39 (Cancelled)

Claim 40 (Original) The method of Claim 1 further comprising applying a patterned resist to the surface of the SOI wafer prior to oxygen implantation.

Claims 41-47 (Cancelled)

Claim 48 (Previously Presented) the method of Claim 31 wherein said inert gas comprises

Claim 49 (Currently Amended) A method of substantially reducing the number of tile or divot defects that are present in a silicon-on-insulator (SOI) substrate, said method comprising the steps of:

[[(a)]] implanting oxygen ions into a surface of a Si-containing substrate, said implanted oxygen ions having a concentration sufficient to form a buried oxide region during a subsequent annealing step; ~~and~~

[[(b)]] annealing said substrate containing said implanted oxygen ions in an ambient gas that comprises from about 0 to about 90% oxygen and from about 10 to about 100% of a high mobility gas selected from the group consisting of He, Kr, H_2 and mixtures thereof to form said buried oxide region which electrically isolates a superficial Si-containing layer from a bottom Si-containing layer, wherein said annealing is carried out until ~~reduces the number of~~ tile or divot defects present at a top surface of said superficial Si-containing layer are reduced so as to allow optical detection of any other defect that has a lower density than the tile or divot defect; and

optically detecting said other defects.

Claim 50 (Currently Amended) A method of substantially reducing the number of tile or divot defects that are present in a silicon-on-insulator (SOI) substrate, said method comprising the steps of:

[[(a)]] implanting oxygen ions into a surface of a Si-containing substrate, said implanted oxygen ions having a concentration sufficient to form a buried oxide region during a subsequent annealing step; ~~and~~

[[(b)]] annealing said substrate containing said implanted oxygen ions in an ambient gas that comprises from about 0 to about 90% oxygen and from about 10 to about 100% of at least one high surface mobility gas, selected from the group consisting of H2, Kr and combinations thereof to form said buried oxide region which electrically isolates a superficial Si-containing layer from a bottom Si-containing layer, wherein said annealing is carried out until ~~reduces the number of~~ tile or divot defects present at a top surface of said superficial Si-containing layer are reduced so as to allow optical detection of any other defect that has a lower density than the tile or divot defect; and

optically detecting said other defects.